

I CLAIM:

1 1. A method of making a colored automotive trim
2 product comprising the steps of:
3 extruding an approximately planar sheet including
4 at least a colored layer, the color layer including color
5 pigment material and metallizing material therein;
6 positioning the approximately planar sheet in a
7 vacuum-forming apparatus;
8 vacuum-forming the sheet into a three-
9 dimensionally shaped preform;
10 providing the preform in a cavity of an injection
11 molding apparatus;
12 injecting heated semi-molten or flowable material
13 into the cavity of the injection molding apparatus so that
14 the semi-molten material bonds to the preform to form a
15 three-dimensionally shaped article;
16 removing the shaped article from the injection
17 molding apparatus; and
18 using the shaped article as at least part of an
19 exterior trim product for a vehicle.

1 2. The method of claim 1, wherein said extruding
2 step further comprises extruding the approximately planar
3 sheet so as to include the color layer and a clear coat
4 layer that is substantially transparent to visible light.

1 3. The method of claim 2, wherein said extruding step
2 further comprises extruding the approximately planar sheet
3 so as to include the color layer, the clear coat layer, and
4 a tie layer located between the color layer and the clear
5 coat layer.

1 4. The method of claim 2, wherein said extruding
2 step further comprises extruding the approximately planar
3 sheet so as to be inclusive of the color layer, the clear
4 coat layer, and a tie layer, wherein the color layer is
5 disposed between the tie layer and the clear coat layer.

1 5. The method of claim 1, further comprising the step
2 of laminating a clear coat layer on the color layer after
3 said extruding step so that the sheet positioned in the
4 vacuum-forming apparatus includes the color layer and the
5 clear coat layer.

1 6. The method of claim 5, wherein said laminating
2 step includes at least one of: (i) laminating the clear coat
3 layer directly on the first layer so that the color and
4 clear coat layers contact one another; and (ii) laminating
5 the clear coat layer on the color layer with a tie layer
6 disposed between the color and clear coat layers.

1 7. The method of claim 1, wherein said extruding step
2 includes extruding the sheet so that the sheet includes the
3 color layer, a first tie layer on a first side of the color
4 layer, a second tie layer on a second side of the color
5 layer, and a substantially transparent layer on the first
6 side of the sheet, whereby the first tie layer is disposed
7 between and promotes bonding of the color layer and the
8 substantially transparent layer.

1 8. The method of claim 1, wherein said extruding step
2 includes extruding the sheet so that the sheet includes the
3 color layer and a first tie layer on a first side of the
4 color layer; and

5 the method further comprising the step of
6 laminating a second tie layer and a substantially
7 transparent layer on a second side of the color layer
8 following said extruding step, so that the second tie layer
9 promotes bonding of the substantially transparent layer to
10 the color layer.

1 9. The method of claim 1, wherein the metallizing
2 material is approximately uniformly distributed throughout
3 the color layer, and the metallizing material includes at
4 least one of: metallic flake pigments, aluminum flakes,
5 nickel flakes, nickel-chrome flakes, and mica flakes.

1 10. A method of making a colored automotive trim part
2 comprising the steps of:

3 providing an at least partially extruded sheet
4 including at least an extruded color layer including color
5 pigment and metallizing particles;

6 providing the sheet in a cavity of an injection
7 molding apparatus;

8 injecting semi-molten material into the cavity of
9 the injection molding apparatus so that the semi-molten
10 material bonds to the sheet to form a three-dimensionally
11 shaped article;

12 removing the shaped article from the injection
13 molding apparatus; and

14 using the shaped article as, or in the manufacture
15 of, an exterior trim part for a vehicle.

1 11. The method of claim 10, wherein said injecting
2 step further comprises injecting the semi-molten material
3 into the cavity of the injection molding device so that the
4 semi-molten material deforms the sheet into the three-
5 dimensionally shaped article.

1 12. The method of claim 10, wherein said providing an
2 at least partially extruded sheet step further includes
3 providing the sheet so that the sheet includes the color
4 layer, a first tie layer, and a substantially transparent

5 layer, wherein the first tie layer is disposed between the
6 color layer and the substantially transparent layer.

1 13. The method of claim 12, wherein said providing an
2 at least partially extruded sheet step further includes
3 providing the sheet so that the sheet includes a second tie
4 layer, wherein the color layer is located between the first
5 and second tie layers.

1 14. The method of claim 13, wherein said providing an
2 at least partially extruded sheet step further includes
3 providing the sheet so that the sheet includes a removable
4 protective layer, wherein the substantially transparent
5 layer is located between the removable protective layer and
6 the color layer.

1 15. A method of making an article for use in the
2 manufacture of a colored exterior vehicle trim part, said
3 method comprising the steps of:

4 providing a sheet including an extruded color
5 layer, the extruded color layer including color pigment
6 material to color the sheet and metallizing material
7 substantially uniformly distributed throughout the color
8 layer;

9 thermo-forming the sheet into a three-
10 dimensionally shaped preform so that the preform is shaped

11 so as to approximately match in shape a contour of at least
12 a portion of a die of an injection molding apparatus;
13 providing the preform in a cavity of the injection
14 molding apparatus;
15 injecting heated flowable material into the cavity
16 of the injection molding apparatus so that the heated
17 flowable material bonds to the preform in the cavity to form
18 a three-dimensionally shaped colored article; and
19 removing the shaped colored article from the
20 injection molding apparatus.

1 16. The method of claim 15, further comprising the
2 steps of:

3 providing the sheet with the color layer, a
4 substantially transparent layer, and a first tie layer
5 disposed between (i) the color layer, and (ii) the
6 substantially transparent layer.

1 17. The method of claim 16, further comprising the
2 step of providing the sheet with the color layer, the
3 substantially transparent layer, the first tie layer, and a
4 second tie layer, wherein the first and second tie layers
5 are on opposite sides of the color layer.

1 18. An automotive trim part comprising:
2 an injection molded base substrate;

3 a layer system on said base substrate; and
4 wherein said layer system includes an extruded
5 colored layer including color pigment material and
6 metallizing particles therein.

1 19. The trim part of claim 18, wherein said layer
2 system further comprises a substantially transparent layer,
3 and wherein said extruded colored layer is located between
4 said substantially transparent layer and said base
5 substrate.

1 20. The trim part of claim 19, wherein said layer
2 system further comprises a first tie layer disposed between
3 said substantially transparent layer and said extruded
4 colored layer.

1 21. The trim part of claim 20, wherein said layer
2 system further comprises a second tie layer disposed on a
3 side of said colored layer opposite said first tie layer, so
4 that said second tie layer promotes bonding of said base
5 substrate to said colored layer.

1 22. The trim part of claim 21, wherein said first and
2 second tie layers are formed by extrusion along with said
3 colored layer.

1 23. A method of making a colored automotive trim
2 product comprising the steps of:
3 providing a sheet including at least a colored
4 layer, the color layer including coloring material therein;
5 positioning the sheet in a vacuum-forming
6 apparatus;
7 vacuum-forming the sheet into a three-
8 dimensionally shaped preform;
9 providing the preform in a cavity of an injection
10 molding apparatus;
11 injecting heated semi-molten or flowable material
12 into the cavity of the injection molding apparatus so that
13 the semi-molten material bonds to the preform to form a
14 three-dimensionally shaped article;
15 removing the shaped article from the injection
16 molding apparatus; and
17 using the shaped article as at least part of an
18 exterior trim product for a vehicle.

1 24. An automotive trim part comprising:
2 a molded base substrate;
3 a layer system on said base substrate; and
4 wherein said layer system includes an extruded
5 colored layer including color pigment material therein.

1 25. An automotive trim part comprising:

2 a molded base substrate;
3 a layer system on said base substrate; and
4 wherein said layer system includes an extruded
5 colored layer including color pigment material and a
6 plurality of different types of metallizing particles
7 therein.

1 26. The trim part of claim 25, wherein the colored
2 layer includes a first group of said metallizing particles
3 of a first shape and a second group of said metallizing
4 particles of a second shape different than the first shape.

1 27. The trim part of claim 25, wherein the colored
2 layer includes a first group of said metallizing particles
3 of a first material and a second group of said metallizing
4 particles of a second material different than the first
5 material.

1 28. A method of making an article for use in the
2 manufacture of a colored exterior vehicle trim part, said
3 method comprising the steps of:

4 extruding a polymer-based material including color
5 pigment material and a plurality of different types of
6 metallizing particles therein so as to form an extruded
7 sheet including an extruded color layer;

8 thermo-forming the sheet into a three-
9 dimensionally shaped preform so that the preform is shaped
10 so as to approximately match in shape a contour of at least
11 a portion of a die of an injection molding apparatus;
12 providing the preform in a cavity of the injection
13 molding apparatus;
14 injecting heated flowable material into the cavity
15 of the injection molding apparatus so that the heated
16 flowable material bonds to the preform in the cavity to form
17 a three-dimensionally shaped colored article; and
18 removing the shaped colored article from the
19 injection molding apparatus.